WHAT IS CLAIMED IS:

1. A zirconia-containing ceramic composition having a c/a ratio of the zirconia lattice in the range of from about 1.005 to about 1.016, and which comprises:

   a. a stabilizing amount up to about 10 mole % of the composition of a stabilizer component, which comprises:

      1. a first metal oxide selected from the group consisting of yttria, calcia, ceria, scandia, magnesia, india and mixtures thereof in an amount of from about 1.5 to about 6 mole % of the composition;

      2. a second metal oxide selected from the group consisting of lanthana, neodymia and mixtures thereof in an amount of from about 0.5 to about 4 mole % of the composition; and

      3. optionally ytterbia in an amount of from about 0.5 to about 4 mole % of the composition;

   b. hafnia in an amount of from about 0.5 to about 15 mole % of the composition; and

   c. optionally tantala in an amount of from about 0.5 to about 1.5 mole % of the composition.

2. The composition of claim 1 which comprises at least about 80 mole % zirconia.

3. The composition of claim 2 which comprises from about 86 to about 97 mole % zirconia and from about 3 to about 10 mole % stabilizer component.

4. The composition of claim 3 wherein the first metal oxide is yttria in an amount of from about 1.5 to about 6 mole % of the composition.

5. The composition of claim 4 wherein the c/a ratio is in the range of from about 1.007 to about 1.013.

6. The composition of claim 4 wherein the second metal oxide is lanthana in an amount of from about 0.5 to about 2 mole % of the composition.

7. The composition of claim 4 which comprises hafnia in an amount of from about 1.5 to about 5 mole % of the composition.

8. The composition of claim 7 which comprises tantala in an amount of from about 0.5 to about 1 mole % of the composition.

9. A thermally protected article, which comprises:
   A. a substrate; and
   B. a zirconia-containing thermal barrier coating having a c/a ratio of the zirconia lattice in the range of from about 1.005 to about 1.016 that is stabilized in the tetragonal crystalline phase, and which comprises:
      1. a stabilizing amount up to about 10 mole % of the thermal barrier coating of a stabilizer component, which comprises:
         a. a first metal oxide selected from the group consisting of yttria, calcia, ceria, scandia, magnesia, india and mixtures thereof in an amount of from about 1.5 to about 6 mole % of the thermal barrier coating of;
         b. a second metal oxide selected from the group consisting of lanthana, neodymia and mixtures thereof in an amount of from about 0.5 to about 4 mole % of the thermal barrier coating; and
         c. optionally ytterbia in an amount of from about 0.5 to about 4 mole % of the thermal barrier coating;
      2. hafnia in an amount of from about 0.5 to about 15 mole % of the thermal barrier coating; and
      3. optionally tantala in an amount of from about 0.5 to about 1.5 mole % of the thermal barrier coating.

10. The article of claim 9 wherein the substrate is a metal substrate, wherein the article further comprises a bond coat layer adjacent to and overlaying the metal substrate and wherein the thermal barrier coating is adjacent to and overlies the bond coat layer.

11. The article of claim 9 wherein the thermal barrier coating has a thickness of from about 1 to about 100 mils.

12. The article of claim 11 wherein the thermal barrier coating has a strain-tolerant columnar structure.

13. The article of claim 12 wherein the thermal barrier coating comprises at least about 80 mole % zirconia.

14. The article of claim 13 wherein the thermal barrier coating comprises from about 86 to about 97 mole % zirconia and from about 3 to about 10 mole % stabilizer component.

15. The article of claim 14 wherein the first metal oxide is yttria in an amount of from about 1.5 to about 6 mole % of the thermal barrier coating.

16. The article of claim 15 wherein the thermal barrier coating has c/a ratio is in the range of from about 1.007 to about 1.013.

17. The article of claim 15 wherein the second metal oxide is lanthana in an amount of from about 0.5 to about 2 mole % of the composition.

18. The article of claim 15 wherein thermal barrier coating comprises hafnia is an amount of from about 1.5 to about 5 mole % of the thermal barrier coating.

19. The article of claim 18 wherein the thermal barrier coating comprises tantala in an amount of from about 0.5 to about 1 mole % of the thermal barrier coating.

20. The article of claim 13 which is a turbine engine component.

21. The article of claim 20 which is a turbine shroud and wherein the thermal barrier coating has a thickness of from about 30 to about 70 mils.

22. The article of claim 20 which is a turbine airfoil and wherein the thermal barrier coating has a thickness of from about 3 to about 15 mils.

23. A method for preparing a thermal barrier coating on an underlying substrate, the method comprising the step of:

A. forming a thermal barrier coating over the substrate by depositing a zirconia-containing ceramic composition having a c/a ratio of the zirconia lattice in the range of from about 1.005 to about 1.016 so that the zirconia is stabilized in the tetragonal crystalline phase, the ceramic composition comprising:

1. a stabilizing amount up to about 10 mole % of the composition of a stabilizer component, which comprises:

a. a first metal oxide selected from the group consisting of yttria, calcia, ceria, scandia, magnesia, india and mixtures thereof in an amount of from about 1.5 to about 6 mole % of the composition of;

b. a second metal oxide selected from the group consisting of lanthana, neodymia and mixtures thereof in an amount of from about 0.5 to about 4 mole % of the ceramic composition; and

c. optionally ytterbia in an amount of from about 0.5 to about 4 mole % of the ceramic composition;

2. hafnia in an amount of from about 0.5 to about 15 mole % of the ceramic composition; and

3. optionally tantala in an amount of from about 0.5 to about 1.5 mole % of the ceramic composition.

24. The method of claim 23 wherein the substrate is a metal substrate, wherein a bond coat layer is adjacent to and overlies the metal substrate and wherein the thermal barrier coating is formed on the bond coat layer.

25. The method of claim 24 wherein the ceramic composition is deposited on the bond coat layer by physical vapor deposition to form a thermal barrier coating having a strain-tolerant columnar structure.